

Effect of Health Insurance on Child and Maternal Health Outcomes in Kenya

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Abstract

It is widely acknowledged that out-of-pocket health payments are both a burden as well as a hindrance to accessing health care, thus leading to worse health outcomes. Health insurance financing mechanism has been proposed as an alternative that will lead to better health outcomes, through its apparent increase in utilization of health care. While Kenya is advocating for the uptake of health insurance, its effects on health outcomes of the vulnerable groups, among them children and mothers, has not been established. This study, therefore, examines the effect of health insurance on child and maternal health, using data from the Kenya Demographic and Health Survey 2008/2009. A logistic model is estimated, and we conclude that while health insurance does not show any beneficial effects on child health as measured by child mortality, there is some evidence that health insurance improves maternal health. Other control variables such as wealth index, employment, distance to health facility and area of residence are equally important in determining child and maternal health. Policies that increase the uptake of health insurance are likely to enhance maternal health. Similarly, there is need to ensure even distribution of health facilities in the country. Further, strategies aimed at poverty reduction, employment creation and education attainment, especially post-primary level of education, should be enhanced to improve child and maternal health in the country.

Abbreviations and Acronyms

BMI	Body Mass Index
CBHI	Community Based Health Insurance
CRS	Categorical Rating Scale
GoK	Government of Kenya
GSOEP	German Socio-Economic Panel
IMR	Infant Mortality Rate
KDHS	Kenya Demographic and Health Survey
KNBS	Kenya National Bureau of Statistics
MDGs	Millennium Development Goals
NHIF	National Hospital Insurance Fund
NHIS	National Health Insurance Survey
NSHIF	National Social Health Insurance Fund
NSSF	National Social Security Fund
OOP	Out-of-Pocket
RMHS	Rural Mutual Health Scheme
VHI	Vietnam's Health Insurance
WHO	World Health Organization

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1. Introduction

1.1 Background to the Study

There is a huge disparity between the developed world and the developing countries in terms of health care financing (Pabblo and Schieber, 2006). According to World Health Organization (WHO, 2011), global health expenditure is approximately 8.5 per cent of global gross domestic product (GDP). Of the total global spending, only 12 per cent (US\$ 350 billion) occurs in low income countries. Worse still, health care financing in these countries relies heavily on out-of-pocket (OOP)¹ expenditure. The World Health Organization (WHO) statistics indicate that in 2008, OOP expenditure in low income countries was 85.7 per cent compared to 38 per cent of private health expenditure² in high income countries (WHO, 2011).

In Kenya, the private sector is the single largest contributor of total health care financing at 37 per cent. Other sources of health care financing in the country include donors and government, who fund 34 per cent and 29 per cent of the total health spending, respectively (Government of Kenya, 2010a). Kenya's OOP expenditure as a percentage of total private health expenditure was 77.2 per cent in 2008, with only 8.8 per cent coming from the private prepaid plans (WHO, 2011).

Largely, out-of-pocket health expenditures are both a burden and a hindrance to health care access and utilization. Typically, health shocks lead to income losses by households both in terms of payment for medical bills, as well as inability to work. The negative impact is particularly high for poor households. As such, even a small amount of health care costs on common illnesses can be catastrophic³ for the deprived (Xu *et al.*, 2003; Saksena *et al.*, 2006). In African countries where the main source of health financing is OOP, households resort to borrowing and selling of assets to cope with losses due to illness, hence perpetuation of poverty (Leive and Xu, 2008). Studies on impact of user fees⁴ on health care access and utilization indicate that user charges may actually lead to delayed health service visits or low utilization of health care (Lagarde and Palmer, 2008; Sepehri and Chernomas, 2001; Mwabu *et al.*, 1995).

¹ Out-of-pocket health payments refer to the payments made by households at the point they receive health care services.

² Private health expenditure is an aggregation of the out-of-pocket expenditure and private prepaid plans.

³ Catastrophic health expenditure means spending more than 40% of the income available on health care after meeting the basic needs (WHO Factsheet N°320, 2007).

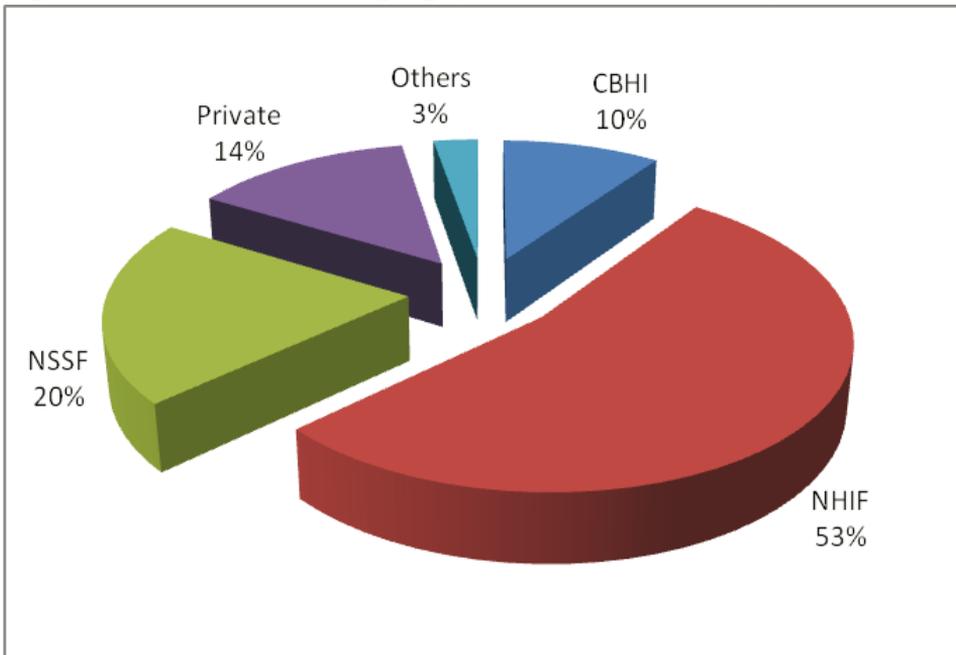
⁴ This is a form of OOP and refers to the payments made by households at the point they receive health care services.

In countries where households have to pay through OOP when they use health care services, prepayment schemes commonly referred to as health insurance are considered as the most preferred financing mechanisms (Drouin, 2007; WHO, 2000). Nyman (1999) opines that health insurance not only protects individuals from financial risks, but also provides access to health care that would otherwise be unaffordable. Existing literature documents the difficulties that the uninsured, as opposed to the insured, face in accessing health care, hence their consequent poor health status (Baker *et al.*, 2006; Jütting, 2003). Health insurance is linked to better health status (Wang *et al.*, 2009; Dow and Schmeer, 2003; Franks *et al.*, 1993) and also higher labour force participation and incomes (Hadley, 2003). Health risk protection not only benefits the individual that is covered, but also their households. Healthy parents are in a position of taking care of healthy children, who in turn become productive in adulthood (Kasule, 2012). Health insurance also protects households from deprivations of basic requirements such as food and education (Ruger, 2007).

The need for health insurance in Kenya has been recognized by policy makers for quite some time now, as exemplified by the establishment of the National Hospital Insurance Fund (NHIF) in 1966 through an Act of Parliament. Initially, NHIF was designed to provide health care to workers in the formal sector and their families. Over the years, however, NHIF has been undergoing transformations aimed at ensuring equity and access to health care services by all Kenyans. For instance, the enactment of the 1998 NHIF Act saw the extension of the scheme's coverage to include the self employed and the informal sector workers (Mathauer *et al.*, 2008). In the recent past, the government's effort has been to introduce and implement the National Social Health Insurance Fund (NSHIF) aimed at covering both the outpatient and inpatient hospital services for the entire population (Currin *et al.*, 2007).

In addition, the government had earlier established the National Social Security Fund (NSSF) in 1965 so as to serve as a social security for Kenyan workers. Although the fund provides financial security to its members, it is a form of health insurance scheme since it provides basic security against eventualities such as employment injury, maternity, illness and/or disability as well as death. Currently, NSSF covers employees in the formal and informal sector.

Besides, the private insurance sector, though small, plays an important role in financing of health care in the country (Kimani *et al.*, 2004). Compared to NHIF, which has over 2 million principal members, private health insurance has about 600,000 members. The two distinct players in this sector include general insurance companies involved in a wide range of insurance, including health insurance, to a small extent, and health insurance providers who are also health

Figure 1.1: Forms of health prepayment schemes in Kenya

Source: Author's computation from KNBS, 2010

care providers operating their own clinics (Barnes *et al.*, 2010). Community Based Health Insurance (CBHI), another form of health insurance existing under the private sector, is organized at the community level. The documented number of this form of health prepayment scheme in the country is 178, with a possibility that there could be many of them that have yet to be identified (Owii, 2008).

Uptake of health insurance (both private and public) in Kenya is low, with only about 10 per cent of the population having some form of coverage. To be precise, only 7 per cent of women and 11 per cent of men are covered by health insurance (KNBS, 2010).

It is imperative at this point to note that other than the government's proposal to shift from user fees to prepaid health financing mechanism, a policy of flat registration fee of Ksh 10 and 20, respectively, at the lowest level of health care (the dispensary) and at the second lowest level of health care facility (the health centre) was introduced in July 2004. The policy exempted children aged below 5 years and specific health conditions such as malaria and tuberculosis from payment. Further, all fees for deliveries in public health facilities, including the lower level health facilities, were abolished in July 2007. Despite these policies, studies at the national and district level indicate that out-of-pocket payments (formal or informal) remain the main source of health care financing. This

implies that provision of health care is not entirely free. Studies conducted at the district level, for instance, indicate that households still pay for health services necessitated by shortage of drugs in the health facilities and other informal costs (DfID, 2009; Chuma *et al.*, 2009).

Health financing mechanisms may be used to improve access to health care, while protecting individuals against financial hardships, ultimately leading to an improvement in health outcomes. In Kenya, while effort towards enhancement of health outcomes has been made, progress towards improvement of both child and maternal health remains a big challenge. The country, for instance, has made considerable gains in the reduction of infant mortality (IMR) and under-five child mortality since 1990. The rates have, however, remained high and far below the MDGs target to which the government is committed to reducing, thus leading to the country being classified as a no progress zone (Bhutta *et al.*, 2010). According to Kenya National Bureau of Statistics (2010), the country's under-five mortality was 74 deaths per 1,000 live births.

Maternal health indicators, on the other hand, are worrisome, with the maternal mortality rate reported at a high of 488 deaths compared to 414 per 100,000 in 2003 (KNBS, 2010). While this is below the Sub-Saharan average of 640 maternal deaths per 100,000, the rate is far much higher than the country's target of reducing maternal mortality by 75 per cent to 147 maternal deaths per 100,000 by 2015. Majority of maternal deaths occur during child delivery. As a result, the World Health Organization has identified delivery in a health care facility, as well as skilled birth attendances, as key indicators of the fifth Millennium Development Goal (MDG). These indicators are still poor in the country, with statistics showing a slight improvement in percentage of the births delivered in hospital from 40.1

Table 1.1: Trends in selected child and maternal indicators

Indicator	Survey Year					2015 (MDGs target)
	1989	1993	1998	2003	2009	
Infant mortality (per 1000 live births)	60	62	71	77	52	26
Under-five mortality (per 1000 live births)	89	105	121	115	74	33
Immunization coverage	73	79	65	59	77	85
Maternal mortality (per 100,000 births)	-	-	590	414	488	147
Skilled birth attendant (%)			42.4	42.0	44.0	90
Births delivered in health facilities (%)		44.0	42.1	40.1	42.6	90

Source: KIPPRA (2010); KNBS (2010)

per cent to 42.6 per cent in 2009. Similarly, skilled birth attendances improved from 40.1 per cent in 2003 to 44.0 per cent (KNBS, 2010). The trends in selected child and maternal health indicators are given in Table 1.1.

Health financing is one of the strategies of improving health status of a population. Amid the various ongoing discussions on the possible policies of health care financing, it is important to investigate the possible effects of health insurance financing mechanism on health outcomes of various categories of the population, and particularly the vulnerable that includes children and women.

1.2 Statement of the Problem

The cost of seeking health care is a key predicament in accessing health care in Kenya (KNBS, 2010; Government of Kenya, 2009a). Despite the government's effort to abolish user fees through various policies, health financing is still reliant on OOP payments, thus making accessibility to health services difficult.

Health insurance financing mechanism plays an important role both as a hedge against financial risk as well as an avenue for pooling the meager household resources so as to increase access to health services. For this reason, various countries such as Ghana, Rwanda and Bolivia⁵ have been focusing on diversifying health financing mechanisms, especially social and community health insurance to cover maternal and child health services. The result of this intervention has been better health outcomes associated with increased utilization of health care as well as improved quality of care (Gobah and Liang, 2011; Schneider and Dmytraczenko, 2003).

In Kenya, health insurance has been identified as a possible financing mechanism that will lead to equity in access to health care. This has been based on the evidence that user fees discourage health care utilization in the country (Government of Kenya, 2009a; Mwabu *et al.*, 1995; Mbugua *et al.*, 1995). Whereas health insurance has been in existence for many years, its role in improving health outcomes, especially for the vulnerable population, has received little empirical analysis in Kenya. One study by Gakii (2010) sought to investigate the role of health insurance on individual self reported health status. The study, however, did not explicitly examine the effect of health insurance on child and maternal health outcomes, hence the need for the current study to enable policy decisions on health financing for maternal and child health care.

⁵This is one of the poorest countries in Latin America.

1.3 Research Questions

- (i) What is the effect of health insurance on child health in Kenya?
- (ii) To what extent does health insurance affect maternal health?

1.4 Objectives of the Study

The overall objective of this study is to examine the effect of health insurance on child and maternal health outcomes in Kenya.

Specifically, the study will:

- (i) Examine the effect of health insurance cover on child health outcomes
- (ii) Determine the effect of health insurance on maternal health
- (iii) Deduce policy recommendations

1.5 Justification for the Study

Kenya, just like any other developing country, aspires to improve the overall well being of her population by addressing all key health indicators as exemplified in various policy documents, among them the Constitution. In particular, there have been numerous calls to improve health outcomes among the vulnerable population, including children and women, both internationally as embodied in the health related Millennium Development Goals (MDGs) and nationally as envisaged in the country's blueprint document, the Vision 2030 (Government of Kenya, 2007).

In an effort to promote equity of access to health care by all Kenyans, the country has proposed a shift from the user fees or OOP payments to financing health care through health insurance schemes (Government of Kenya, 2007).

This study comes at a time when there is extensive debate about potential health financing reforms. Some of the financing arrangements put forth range from user-fees with waivers for the poor, the introduction of social health insurance, and extending the role of the private sector in financing health care through voluntary health insurance (Government of Kenya, 2009b). This study thus endeavours to provide an insight into the association between health insurance financing mechanism and child and maternal health outcomes.

2. Literature Review

2.1 Theoretical Literature

There are three approaches that can be used in assessing the role of health insurance. The first perspective is the financial security theory, which argues that people purchase health insurance in order to avoid financial risk. The proponents of this school of thought base their arguments on the expected utility theory, which postulates that people generally prefer certainty to risk. Health care needs are generally unpredictable (Arrow, 1963). Risk-averse individuals would therefore purchase actuarially fair health insurance in order to level out their income in case of the unfortunate state of illness (Cutler and Zeckhauser, 2000).

Nyman (1999), however, provides an alternative explanation by arguing that health insurance benefit is not limited to financial risk avoidance, but also that insurance has an access value. Health insurance makes medical care that would otherwise be inaccessible to be affordable. Murray echoes this argument by noting that health insurance is a tool by which people access health care. Ruger (2007) provides a moral foundation for health insurance that is based on Aristotelian concept of human flourishing. She observes that health insurance creates conditions of human flourishing by keeping people healthy as well as protecting ill individuals and their households from insecurity and harmful deprivations of essential goods, including food and education. Health insurance not only improves the health of the person covered by health insurance, but also the household of such an individual.

The final approach arises from the view that health insurance may suggest health care services are provided at zero or low monetary cost, a characteristic termed as moral hazard (Pauly, 1968). This would be presented as situations where households would reduce preventive measures (*ex-ante* moral hazard) as health insurance makes it easier to seek health care when sick (*ex-post* moral hazard). Cutler and Zeckhauser (2000), however, argue that the idea of moral hazard in the context of health insurance is not considered a serious issue, since individuals are not expected to put their health or that of their children at risk, as is the case with material assets, since a loss of health is consequential.

Given the argument that health insurance is not necessarily problematic, particularly in the context of low income countries where there are substantial unmet health needs, this study borrows from the second approach, in which health insurance is seen as an avenue for promoting health to explain the role of health insurance in improving maternal and child health outcomes. Grossman (1972) in his health production model observes that investment in health is a function of medical input, as well as other market goods. Health insurance is therefore

considered as an input in the health production model, since it leads to utilization of health care, one of the most important investments in health.

2.2 Empirical Literature Review

It is presumed that health insurance improves health status of the insured through increased utilization of health care. The empirical literature discusses two strands of literature. To start with, a number of studies have investigated the role of insurance in improving health care access. In Germany, Hulleig and Klein (2010) sought to investigate the effect of private health insurance on medical utilization as indicated by the number of doctor visits as well as number of nights spent in the hospital. Utilizing survey data from the German Socio Economic Panel (GSOEP), this study concluded that private health insurance had a significant negative effect on the number of doctor visits. This was explained by the fact that privately insured individuals were given more medical attention compared to the publicly insured. The effect of private health insurance on the number of nights spent in the hospital was, however, not significant.

Assessing the Mexican Universal Health Insurance Programme (*Seguro Popular*), which aimed at providing financial protection for the poor, King et al. (2009) established that while the programme reduced overall catastrophic as well as out of pocket expenditures for outpatient and inpatient medical services, the utilization of health care by the poor had not increased. In contrast, Sosa-Rubi et al. (2009) established that *Seguro Popular* actually improved access to health services by diabetic insured adults in Mexico.

Applying a difference-in-difference methodology on longitudinal survey data, Chen et al. (2006) examined the effects of Taiwan's National Health Insurance on utilization of health care by the elderly. The study concluded that health insurance improved access to both outpatient and inpatient health care services. Moreover, there was a reduction in inequalities in access to health care between the high and low-income individuals as a result of health insurance coverage.

With the growing interest in Community Based Health Insurance (CBHI) in low and middle income countries, studies have sought to examine its role in health improvement. Gnawali et al. (2009) conducted a study on the effect of CBHI on utilization of modern health services in Burkina Faso using household survey data collected in Nouna District. The results of the study indicate that CBHI increased the chances of utilization of health care, although there was no effect on inpatient utilization. Similar results are echoed by Ekman (2007) who concludes that health insurance broadly increases probability of health care use, although some programmes showed insurance effect, while others did not.

Equally, Zhou *et al.* (2009) investigated the effect of Rural Mutual Health Scheme (RMHS) on outpatient service utilization in China, applying random effect models on three year panel data. The findings indicated that although the community health insurance scheme increased the number of outpatient visits in Chinese villages, the same seemed to decrease with the introduction of supply side policies.

While few empirical studies conducted in Kenya investigate the effect of health insurance on health utilization per se, various studies have examined the effect of user fees, an alternative health care financing mechanism, on health care utilization. For instance, Mwabu *et al.* (1995) established that outpatient visits decreased by 52 per cent following the introduction of user fees in 1989. Likewise, Mbugua *et al.* (1995) indicated that user charges negatively affected the use of health care by the poor. Ngugi (1999) shows that whereas there was an increase in the use of private health facility, mainly the missionary hospitals following the introduction of user fees, use of public health facilities declined.

Recent work by Gakii (2010) in Kenya examined the role of health insurance on health care demand and choice of health care provider. Employing a logit model on data from the 2007 Kenya Household Expenditure and Utilization Survey, she established that individuals with insurance reported a higher probability of seeking health care as well as higher chances of visiting private as opposed to public health facility.

The second strand of literature goes beyond utilization of health care to examine the effect of health prepayment schemes on various indicators of health, including self reported health status, mortality and birth weight, among others. Empirical studies mentioned earlier, among them Hullegie and Klein (2010) as well as Gakii (2010), went ahead to investigate the role of health insurance on reported health status, and concluded that the insured as opposed to the uninsured, reported better health status.

Similarly, Wang *et al.* (2009) using the difference-in-difference in combination with the propensity score matching estimated the impact of Rural Mutual Health Care (RMHC) on self-perceived health as measured by 5-Point Categorical Rating Scale (CRS) and EQ-5D instruments. The difference-in-difference method was applied to remove time invariant unobservables, while the propensity score match was used to eliminate selection bias on observables. The study made use of longitudinal data collected through surveys from households and individuals in a baseline survey, one year prior to the intervention in 2002 and an impact evaluation survey undertaken two years after the intervention in 2005. They found that expansion of RMHC led to improved health status of the insured and the poor. The impact of the health insurance expansion was higher among

individuals aged between 35-54 years, as opposed to those aged between 15-35 years and among those who were sick.

Following the expansion of Medicaid (public health insurance) eligibility in the US to include low income children, Currie and Gruber (1996) investigated the effect of this expansion on child health care utilization as well as child mortality. Using linear probability model on National Health Interview Survey (NHIS) data collected between 1984 and 1992, they pointed out that there was a significant reduction in child mortality.

Hanratty (1996) established that the introduction of Canadian National Health Insurance led to a decrease in infant mortality. This study employed a logistic regression on panel data obtained from Census of Canada and Canada's Division of Vital Statistics from 1960 to 1975. The results, on the other hand, were not clear on the effect of national health insurance on increased birth weight, although they indicate that the overall incidence of cases of low birth weight decreased.

A study on the adoption of Vietnam's Health Insurance (VHI) by Wagstaff and Pradhan (2005) estimates the impact of the National Health Insurance on health outcomes as measured by height and weight for children and Body Mass Index (BMI) for adults. The study included other variables perceived to impact on health outcomes, such as medical care, food consumption and expenditure on water. Using the double-difference estimator on panel data from the Vietnam Living Standard Survey (VLSS), they found positive impacts of insurance on child and adult health; that is, children in the insured group grew faster and the adults had improved Body Mass Index (BMI). Similarly, they conclude that VHI increases the probability of contact with health care providers and non-medical household consumption since it lowers out-of-pocket health expenditures.

Still, a study conducted by Chen and Jin (2010) in China sought to establish whether New Cooperative Medical Scheme (NCMS), a type of health insurance targeting rural population, led to better health and educational outcomes. The study used data from the 2006 China Agriculture Census, and health outcomes were measured using child and pregnancy mortality. Child enrolment, on the other hand, was used as a proxy for educational outcomes. The results indicate that households with NCMS had better school enrolments and lower child and pregnancy mortality than the uninsured, although there was no effect on health outcome when the difference-in-difference propensity score method was controlled for. The NCMS, to some extent, reduced delay of enrolment in school for some six-year-olds. The results contradict those of Lei and Lin (2009), which show that NCMC did not improve health status in China.

In Rwanda, Binagwaho *et al.* (2012) sought to establish the impact of Mutuelle, a community based health insurance, on child health as indicated by height-for-age z-scores. Using a probit model together with instrumental variable approach on data from the 2010 Rwandan Demographic and Health Survey (RDHS), they find that health insurance increases the likelihood of seeking health care when ill, consequently leading to better height-for-age z-score of insured children.

Dow and Schmeer (2003) examined the effect of health insurance on infant and child mortality in Costa Rica. Using data from county-level statistics and national population census collected between 1973 and 1974, they conclude that health insurance and mortality are strongly related, before controlling for other time-varying variables. However, after controlling for changes in other correlated maternal, household and community characteristics, the fixed effects models indicate that insurance expansion appeared to explain only a small portion of the mortality change. In the same line, while correcting for endogeneity, Dow and Schmeer (2003) confirm that health insurance expansion in Costa Rica did not result in a statistically significant effect in child mortality.

In relation to maternal health indicators, studies have also been carried out to establish the relationship between health insurance and such maternal health indicators as health use of prenatal care and delivery in a hospital. Mensah *et al.* (2010) carried out a study to examine the effect of National Health Insurance Scheme on child health as measured by infant deaths/birth complications and maternal health as proxied by uptake of prenatal care and birth at a hospital in Ghana. Advancing from the traditional regression approach by Xiao *et al.* (2010), they use Propensity Score Matching techniques on survey data collected from a sample of 2,000 respondents (400 NHIS members and 1,600 non-members) in 2007, and found that members of NHIS were more likely to use prenatal care, deliver in hospitals, and be attended by trained professionals compared with non-members. They were also less likely to experience birth complications and infant deaths.

2.3 Overview of Literature

The studies reviewed have used different measures of health outcomes, among them mortality and self reported health status of various population groups, as well as access to health care services to establish the effect of health insurance on health. The findings of the different studies are diverse, with some studies indicating that health insurance has some significant effect on some indicators of health, while others indicate otherwise.

In Kenya, while there has been an attempt to expand the level of health insurance coverage, literature is thin on the overall effect of health insurance ownership on health outcomes of various categories of the population. The study by Gakii (2010) used self reported health status as a measure of health, with the results indicating that health insurance improved health status. The current study adds to the existing quantitative literature by examining the role of health insurance and on the health outcomes of the high need groups in Kenya, in particular, the under-five and mothers.

3. Methodology

3.1 Conceptual Framework

The most reasonable pathway through which health insurance affects health status is through improved access to and utilization of medical care. In particular, health insurance financing mechanism is a substitute for out-of-pocket payments, thus leading to a reduction in the cost of health care. By lifting the financial constraint, access to both preventive and curative health care should be increased. The latter aspect, however, is conditional on the supply of health care facilities and the quality of treatment received. Assuming that the quality of care is given, we would expect a direct positive influence of health insurance on population health outcomes through improved access to overall health care (Binagwaho *et al.*, 2012).

To examine the effect of health insurance on child and maternal health outcomes, this study adopts the household production model as postulated by Grossman (1972) and follows the health production framework as illustrated by Dow and Schmeer (2003). In this model, insurance is hypothesized to lower price and increase demand for health care. This in turn leads to an improvement in health status. This phenomenon implies health care is an input for the health production function.

Health is a function of medical inputs M_i , non-medical health inputs S_i (such as sanitation), the health environment E_c in community c and the unobserved health/biological endowment: \mathcal{O}_i

Demand for medical input is chosen by individuals or households to maximize health with limited resources. Health insurance I_i increases health care demand, which also depends on health infrastructure P_c (including time dimensions associated with geographic access), socio-economic characteristics W_i such as household wealth and education attainment levels, in addition to health and unobserved preferences π_i :

$$M_i = M(I_i, W_i, P_c, H_i, \pi_i) \dots \dots \dots (ii)$$

Non-medical inputs S_i depend on similar factors as M_i , although the cross-price effect of insurance may be ignorable.

$$S_i = S(W_i, P_c, H_i, \pi_i) \dots \dots \dots (iii)$$

Health insurance may be considered as endogenous to the system, depending on factors such as socioeconomic status, health care access barriers, health status and unobserved preference for medical care:

$$I_i = I(W_i, P_c, H_i, \pi_i) \dots \dots \dots (iv)$$

The following expression is interpreted as the reduced form health demand function:

$$H_i = H(I_i, W_i, P_c, E_c, \theta_i, \pi_i) \dots \dots \dots (v)$$

Where H_i is a measure of health outcome that solely depends on health insurance I_i , socio-economic characteristics W_i , health infrastructure P_c , health environment E_c , and unobserved factors captured by θ_i and π_i .

3.2 Estimation Model

To estimate the effect of health insurance status on child health outcomes, the following equation was estimated, while controlling for individual, household, environmental and socio-economic attributes:

$$Y_{ij} = \beta_0 + \beta_1 I_{ij} + \beta_2 X_{ij}^P + \beta_3 X_{ij}^E + \beta_4 X_{ij}^W + \beta_5 X_{ij}^A + \varepsilon_i \dots \dots \dots (vi)$$

where Y_{ij} = the child i health outcome in household j . Child mortality was used as a measure of child health outcome.

I_j = a dummy variable representing the health insurance status of the household head.

$X_{ij}^P, X_{ij}^E, X_{ij}^W, X_{ij}^A$ are vectors of health infrastructure, for instance distance to the nearest hospital, environmental (sanitation), socio-economic (education, wealth index and employment status) as well as individual attributes.

ε_i = stochastic error term.

In the analysis of child health, the variable of interest is the survival of a child to the fifth year of birth or death of the child before reaching five years in the sample. The child survival outcome variable is binary in nature, where the child survives or not. As a result, the effects of health insurance and other covariates on the probability of a child's death was estimated using the logistic regression.

The standard logistic regression model is specified below:

$$Pr ob(Y = 1 | X) = \frac{\exp^{X'\beta}}{1 + \exp^{X'\beta}} \dots \dots \dots (vii)$$

where the probability for the realization of the event $Y = 1$ (in our case child survives to its fifth birthday, else 0), conditional on the covariate vector X is determined by the logistic function of the covariate vector X and the vector of coefficients β .

To examine the effect of health insurance on maternal health, equation vi is estimated where Y_{ij} now represents maternal health outcome of mother i in household j as measured by skilled birth attendance. The control variable

$I_{ij}, X_{ij}^P, X_{ij}^E, X_{ij}^W, X_{ij}^A$ are as defined in equation vi

In the analysis of maternal health, the outcome variable is binary in nature and the probability of realization of the event $Y=1$ in this case is utilization of skilled birth attendance as opposed to none; that is $Y=0$. The standard logistic model in equation vii is utilized in this analysis.

3.3 Description of Variables

3.3.1 Outcome variables

Following the model specification, we describe the main outcome variables in this study. The first outcome variable is child mortality. This variable is aimed at measuring child health. The variable is coded as a binary variable, taking the value of 1 if a child is reported to have survived to the fifth year, and 0 if the child died before the age of five years.

The second outcome variable is skilled birth attendance, which is used as a proxy for maternal health. The variable is also coded as a binary outcome taking the value of 1 if a woman is attended by a skilled birth attendant, that is, a doctor or a trained nurse, and 0 otherwise.

3.3.2 Independent variables

The independent variable of interest in this study is health insurance status of individual in the households. Crucially, the 2008-2009 Kenya Demographic and Health Survey (KDHS) for the first time collected data on health insurance, where individuals were coded as insured if they reported having health insurance. Generally, children have the same health insurance status as their parents, an assumption that we make in this study. Distance to hospital was also considered a key variable in this study, since the variable can be a barrier both to the health care access as well as a determining factor in the uptake of health insurance as explained in the conceptual framework.

Other explanatory variables controlled for include: child (child's gender, birth order and single birth) and mother characteristics (educational attainment, age) as well as household characteristics such as gender of household head, employment status, wealth index, household size, sanitation, household's use of treated nets and area of residence. The specific variables included in the analysis are defined in Table 3.1 and 3.2.

Table 3.1: Summary of the study variables-child health

Variab les	Measurement/definition of variables	Expected sign
Outcome variables		
Child mortality	Proxy for child health. Dummy variable (Child Survives=1, else 0)	
Explanatory variables		
Health insurance status	Household health insurance status (1=has insurance cover, 0 otherwise)	Positive (+)
Gender of the child	Sex of the child (male=1,female=2)	Positive (+)
Single birth	Dummy (twin birth=0, single birth=1)	Positive (+)
Birth order	Order of birth of the child	Positive (+)
Age of the mother	Age group of the mother. Categorized into:1=15-24, 2=25-34 and 3=35 and above	Positive (+)
Education	Highest level of education obtained by the household head. Categorized into: 0=none, 1=primary, 2=secondary and 3= higher	Positive (+)
Employment status	A dummy variable (1= currently working, 0=otherwise)	Positive (+)
Gender of the household head	A dummy variable (male =1, female=2)	Indeterminate
Wealth index	Proxy for economic welfare ranging from 1= poor, 2= middle, and 5= rich	positive (+)
Household size	Number of household members	Negative (-)
Place of residence	A dummy variable (1=rural,2=urban)	Positive (+)
Sanitation	A dummy variable (1=toilet facility, 0=no facility)	Positive (+)
Distance to the nearest health facility	Proxied by time taken to fetch water (0= premises, 1=less than 1 hour, 2=1 hour and above)	Negative (-)

3.4 Data Type and Sources

This study used cross-sectional household survey data from the 2008-2009 Kenya Demographic and Health Survey (KDHS). This survey is nationally representative and uses multistage cluster sampling technique to collect data on the health situation of the households in the country, including maternal and child health indicators such as mortality and nutritional status. The 2008-2009 KDHS is the latest available KDHS data set that, for the first time, included questions pertaining to health insurance status of respondents, besides detailed information on a series of personal characteristics including age, gender, marital status, area of residence, highest level of education attained, socio-economic status as measured by wealth index, in addition to the household characteristics.

Table 3.2: Summary of the study variables-maternal health

Variables	Measurement/definition of variables	Expected sign
Outcome variable		
Skilled birth attendance	Proxy for maternal health. Dummy variable (Mother utilized skilled birth attendance=1, else 0)	
Explanatory variables		
Health insurance status	Household health insurance status (1=has insurance cover, 0 otherwise)	Positive (+)
Birth order	Order of birth of the child	Positive (+)
Age of the mother	Age group of the mother. Categorized into: 1=15-24, 2=25-34 and 3=35 and above	Positive (+)
Age at first birth	Mother's age at first birth	Positive (+)
Education	Highest level of education obtained by the household head. Categorized into: 0=none, 1=primary, 2=secondary and 3= higher	Positive (+)
Employment status	A dummy variable (1= currently working, 0=otherwise)	Positive (+)
Gender of the household head	A dummy variable (male =1, female=2)	Indeterminate
Wealth index	Proxy for economic welfare ranging from 1= poor, 2= middle, and 5= rich	Positive (+)
Household size	Number of household members	Negative (-)
Place of residence	A dummy variable (1=rural,2=urban)	Positive (+)
Distance to the nearest health facility	Proxied by time taken to fetch water (0= premises, 1=less than 1 hour, 2=1 hour and above)	Negative (-)

4. Data Analysis

4.1. Descriptive Statistics

Table 4.1 presents various individual and household characteristics of the sample. Interpreting the mean, majority of the mothers (54%) were aged 35 years and above. About 34 per cent were aged between 25 and 34 years, while 12 per cent were in the age bracket of 15 and 24 years. The mean age at first birth was 19 years. As regards education, majority of the respondents had primary level of education (56%) compared to 16 per cent and 4 per cent with secondary and post-secondary level of education, respectively. Twenty four (24) per cent reported that they had no education; 79 per cent of the respondents were rural based and 21 per cent urban areas. Most households were male headed (64%). The average number of household members was 6, while that of the number of children under five years was 1.

The socio-economic status as measured by wealth index indicates that most of the respondents were poor (46%). The average for the middle and rich wealth index was 19 per cent and 35 per cent, respectively. The mean number employed was about 64 per cent of the study population, and only 6 per cent has some form of health insurance.

Information on children was collected from birth history as reported by the mother. On average, 51.14 per cent of the children were male. The birth order number of the majority was 3. Overall, households reported that 90 per cent of their children aged between 0 and 37 years were alive as opposed to 10 per cent. However, taking into consideration the survival status of the under five children, 74 per cent had survived to the fifth year, while 26 per cent did not.

On maternal health indicators, majority of mothers delivered at home (58%) in relation to 32 per cent and 10 per cent deliveries in public and private hospitals, respectively. Correspondingly, skilled birth attendance during delivery was 44 per cent, while the non-skilled birth attendance was 56 per cent.

Table 4.2 summarizes health insurance status across selected sample characteristics. From the results, among the young mother's aged between 15 and 24 years, majority were uninsured (98%) as opposed to the insured (2%). The percentage of mothers aged between 25 and 34 years who were insured were 6 per cent, while the uninsured were 94 per cent. The proportion was similar for those aged over 35 years.

Considering education attainment, hardly 1 per cent of those with no education were insured in contrast with almost 100 per cent who were uninsured. Of those

Table 4.1: Sample characteristics description

Characteristic	Frequency	Mean (%)
Mother's age		
15-24	2,628	11.66
25-34	7,789	34.57
>35	12,117	53.77
Age at first birth		19
Education level-Highest level of education		
No education=0	5,359	23.78
Primary=1	12,542	55.66
Secondary=2	3,665	16.26
Post-secondary=3	968	4.30
Area of residence		
rural=1	17,862	79.27
urban=2	4,672	20.73
Number of household members		6
Number below age five		1
Gender of the household head		
Male=1	14,463	64.18
Female=2	8,071	35.82
Wealth Index		
Poor=1	10,471	46.47
Middle=2	4,211	18.69
Rich=3	7,852	34.85
Health insurance cover		
1=health insurance	21,250	94.41
0=no health insurance	1,259	5.59
Employment status		
0=No	8,095	36.07
1=yes	14,345	63.93
Child sex		
Male	11,523	51.14
Female	11,011	48.86
Birth order		3
Child survival status (all)		
1=yes	2,205	9.79
0=no	20,329	90.21
Child survival status (under five years)		
1=yes	5,706	74.31

0=no	1,973	25.69
Maternal health		
Place of delivery		
Home=0	3,477	57.40
Public facility=1	1,946	32.12
Public facility=2	635	10.48
Skilled birth attendance		
Yes=1	2,638	43.54
No=0	3,421	56.46

Source: Author's computation

with primary level of education, majority were uninsured (97%), compared to 3 per cent with some form of health insurance. Within the secondary level of education, less were insured at 12 per cent than the uninsured at 88 per cent. At the highest level of education (post-secondary), 49 per cent were insured compared to 51 per cent uninsured. A higher uptake of health insurance at higher levels of educational attainment is expected, since the educated are likely to make informed choices concerning their health.

With regard to area of residence, only 4 per cent of those located in the rural areas were insured, while 96 per cent were uninsured. On the other hand, 13 per cent of the urban residents were insured compared to the uninsured who accounted for 87 per cent. Six (6) per cent of the male household heads were insured, while 94 per cent were uninsured. In the case of female household heads, 5 per cent reported they had some form of health insurance as opposed to 95 per cent with none.

As for wealth index, in the poor category, a dismal 1 per cent were insured against 99 per cent uninsured. In the middle category, 4 per cent were insured in contrast to 96 per cent with no insurance. For the rich, the insured and uninsured were 13 per cent and 87 per cent, respectively. Turning to employment status, 7 per cent of those employed were insured, while 93 per cent were uninsured. Among the unemployed, only 3 per cent were insured, whereas 97 per cent were uninsured. Both wealth index and employment status generally indicate the affordability to purchase health insurance.

Lastly, 13 per cent of those nearer the hospital (as measured by time taken to fetch water) were insured compared to 87 per cent who were uninsured. For those far away from the hospital, only 2 per cent were insured, while 98 per cent were not. This is expected since one would consider, first, the availability of health infrastructure before taking up health insurance.

Table 4.2: Health insurance status by selected sample characteristics

Characteristics	Total	Insured (%)	Not Insured (%)
Mother's age			
15-24=1	2,624	1.87	98.13
25-34=2	7,776	5.57	94.43
>=35=3	12,109	6.42	93.58
Highest Level of education			
No education=0	5,347	0.26	99.74
Primary=1	12,537	2.69	97.31
Secondary=2	3,657	11.89	88.11
Post-secondary=3	968	48.86	51.14
Area of residence			
Rural=1	17,845	3.60	96.40
Urban=2	4,664	13.23	86.77
Gender of the household head			
Male=1	14,445	5.79	94.21
Female=2	8,064	5.23	94.77
Wealth Index			
Poor=1	10,453	0.55	99.45
Middle=2	4,211	3.75	96.25
Rich=3	7,845	13.31	86.69
Employment status			
Yes=1	14,337	7.31	92.69
No=0	8,080	2.55	97.45
Distance to hospital (proxied by time to fetch water)			
Premises=1	6,164	13.30	86.70
<1 hour	11,790	2.88	97.12
>=1 hour	4,205	1.69	98.31

Source: Author's computation

4.2 Empirical Results

4.2.1 Effect of health insurance on child health

The results of the effect of health insurance and other control variables on child mortality are reported in Table 4.3. The dependent variable is binary in nature, the outcome of which is either the child survives the first five years of life (1) or the child dies before celebrating the fifth birthday (0). Thus, the logistic regression model is used in estimating the likelihood of a child surviving the first five years of life. The key independent variable of interest in this model is the health insurance status of individuals in a household.

As expected, health insurance status has a positive effect on child health. The results indicate that health insurance increases the probability of a child survival by 2 per cent. However, the effect is not significant. These findings are in line with findings by Dow *et al.* (2003) and Dow and Schmeer (2003), but contradict Currie and Gruber (1996). The inconsistent findings could probably be explained by the quality and extent of coverage of health insurance in different countries. For instance, this study uses the latest available KDHS data set, which was collected during a period in which the National Health Insurance Fund (NHIF), to which majority of the respondents (53%) belong, did not cover outpatient services for the principal members and their dependants. This may not be the case in developed countries such as in the US where health insurance has been extended to the low income children (Currie and Gruber, 1996).

Other control variables were considered in the analysis based on existing literature. Distance to a health facility is one of the factors that affects access to health care, hence the health outcomes of a population. Since the survey did not collect data on distance to hospital, this study used time taken to fetch water as a proxy for this variable (Adeoti and Awoniyi, 2012). The regression results show that the variable has a negative and significant effect on chances of child survival. Less than one hour distance to hospital decreases the chance of child survival by 8 per cent, relative to having a hospital nearer one's premises. Similarly, at least one hour distance to hospital decreases the probability of child survival by 7.7 per cent. Geographical accessibility of health care facility has been identified as a barrier to health care utilization (Kadobera *et al.*, 2012). This is mainly because long distances lead to both high transport and time costs. Besides, it is a barrier to uptake of health insurance as was hypothesized by Dow and Schmeer (2003) and as observed in the descriptive results.

Malaria is one of the causes of child morbidity and mortality in Kenya. We therefore consider use of treated bed nets as a proxy for a household's preventive behaviour against malaria. From the results, having treated bed nets as opposed to none has a positive but insignificant effect on the probability of child survival. This may be explained by low usage of insecticide treated nets as has been observed in some parts of the country (Alaii *et al.*, 2003)

The wealth index, which is a measure of household income, has positive effect as expected. In comparison with the poor wealth index, being in the middle wealth index increases the probability of child survival by a small percentage of 0.1 per cent, although the effect is not significant. Holding other factors constant, being in the rich wealth index as opposed to the poor wealth index significantly increases the probability of child survival by about 4 per cent. Surprisingly, being in employment as opposed to unemployment decreases the probability of child

survival by approximately 8 per cent. In literature, this is possible depending on the occupation and the nature of employment. Studies, for instance, have indicated that labour force participation by mothers may actually lead to lower chances of child survival, if the nature of work reduces the time taken to take care of the child (Basu and Basu, 1991).

The education variable has a positive effect on the probability of child survival as expected. Primary level of education of the household head increases the chances of child survival by 0.3 per cent relative to no education, but the effect is not significant. The effects of secondary and post-secondary education are both significant. Moving from no education to secondary education increases the chance of a child's survival by 11 per cent. The effect of post-secondary education is phenomenal, with the group increasing the probability of child survival by about 18 per cent relative to no education.

Other household characteristics included in the analysis were area of residence, gender of household head and number of household members. Although being female head and urban resident increases the chance of survival of the under-five by 1.5 per cent and 1 per cent, respectively, the results are not significant. From the results, household size represented by the number of members in a household is negatively related to the probability of child survival. A one unit increase in number of household members significantly decreases the probability of child survival by 1.2 per cent. This is expected as large families compete for the few available resources.

On demographic characteristics, the results show that a higher age group of the mother decreases the chance of child survival. Relative to mothers aged between 15 and 24 years, the age group significantly decreases the probability of child survival by 25 per cent and 72 per cent, respectively, for ages between 25 and 34 and over 35 years. Contrary to many studies that indicate that an increase in the age group of the mother increases the chances of a child's survival, this study finds that child mortality increases with the mother's age. This is probably due to the fact that most elderly mothers are also in employment, which has been associated with higher child mortality in our earlier findings.

The results also indicate that a female child is likely to survive to the fifth year compared to their male counterparts. Being a female child, for instance, increases the probability of survival by 2 per cent. On the other hand, single births have a higher probability of survival (33%) in relation to multiple births. The higher likelihood of child survival among the females as well as single births has been associated with biological reasons (Kombo and Ginneken, 2009). Holding other factors constant, a unit increase in birth order significantly increases the probability of child survival by approximately 7 per cent.

Table 4.3: Effect of health insurance on child mortality-Logit results

Independent variables	Coefficients (Logit)	Marginal effects	Odds ratio
Health insurance status	0.130 (0.18)	0.020 (0.03)	1.14 (0.21)
Wealth index (reference group: Poor)			
Middle	0.007 (0.09)	0.001 (0.01)	1.01 (0.09)
Rich	0.275* (0.10)	0.043* (0.01)	1.32* (0.14)
Education level (reference group: No education)			
Primary	0.022 (0.09)	0.003 (0.01)	1.02 (0.09)
Secondary	0.827* (0.13)	0.110* (0.01)	2.29*(0.29)
Post-secondary	1.934* (0.24)	0.175* (0.01)	6.91* (1.68)
Employment status	-0.490* (0.07)	-0.076* (0.01)	0.61* (0.04)
Area of residence	0.067 (0.11)	0.011 (0.02)	1.07 (0.11)
Number of household members	-0.077* (0.01)	-0.012*(0.002)	0.08* (0.02)
Gender of household head	0.093 (0.07)	0.015 (0.01)	1.10 (0.08)
Child gender	0.147** (0.06)	0.023** (0.01)	1.16** (0.07)
Twin birth	1.535* (0.14)	0.330* (0.04)	4.64* (0.67)
Birth order	0.419* (0.02)	0.067* (0.003)	1.52*(0.03)
Mother's age group (reference group: 15-24 years)			
25-34	-1.452* (0.10)	-0.245* (0.02)	0.23* (0.02)
>35	-3.886* (0.12)	-0.721* (0.01)	0.02* (0.002)
Distance to hospital -proxied by time to fetch water (Reference group=premises)			
Less than one hour	-0.517* (0.09)	-0.081* (0.01)	0.60* (0.05)
One hour or more	-0.447* (0.12)	-0.077* (0.02)	0.64* (0.07)
Sanitation	0.144*** (0.09)	0.023*** (0.01)	1.16*** (0.10)
Bed nets	0.034 9(0.06)	0.005 (0.01)	1.03 (0.07)
Constant	-0.452 (0.32)	-	-
Log likelihood = -3181.9841; Number of observations = 7488; LR chi2(19)=2186.85; Prob > chi2 = 0.0000; Pseudo R2 = 0.2557			

Source: Author's computation from KDHS

*, **, *** significant at 1%, 5% and 10%, respectively; Standard errors in parenthesis,

A household environmental factor considered in this study is sanitation as indicated by whether a household has a toilet facility or not. Having sanitation significantly increases the probability of child survival by 2 per cent as opposed to having none. The findings on the role of household environment on child health is in line with findings by Fayehun (2010) and Mutunga (2007).

4.2.2 Effect of health insurance on maternal health

Table 4.4 presents the results of the logistic regression model showing the effect of health insurance and other covariates on maternal health as measured by utilization of skilled birth attendance during delivery. Health insurance status, which is a key variable in this study, has significant effect on the maternal health. Being insured as opposed to uninsured significantly increases the probability of skilled birth attendance by 25%. Since skilled birth attendance is highly correlated with delivery in a health facility (Appendix Table 1), the implication of these results is that health insurance is important in improving maternal health by increasing the chance of delivering in a health facility (Xiao *et al.*, 2010; Mensah *et al.*, 2010).

Distance to hospital decreases the likelihood of skilled birth attendance. Taking the reference category as those individuals nearer to hospital premises, less than an hour distance to the hospital decreases the probability of skilled birth attendance by 21 per cent. Similarly, at least one hour distance to hospital decreases the chance of seeking skilled birth attendance by 17 per cent. This variable has been reported to be a significant determinant in utilization of maternal health services.

Other socio-economic factors were found to have a significant effect on maternal health. They include wealth index, employment status and education. The probability of skilled birth attendance is positively related with wealth index. Compared with mothers from poor wealth index, those from the middle wealth index are likely to seek skilled birth attendance by 12 per cent. The probability further increases for those in the rich wealth index by 17 per cent. Similarly, being in employment increases the probability of skilled birth attendance by about 5 per cent as opposed to being unemployed.

The probability of choosing skilled birth attendance increases with level of education. Primary level of education in comparison with no education increases the probability of skilled birth attendance by 16 per cent. Secondary and post-secondary levels of education increase the probability of skilled birth attendance by 34 per cent and 42 per cent, respectively. The education, employment and wealth index variables positively influence the decision making powers of women about their own health and that of their counterparts (Mpembeni *et al.*, 2007).

Among the household characteristics, a unit increase in number of household members decreases the probability of skilled birth attendance by 0.3 per cent. On the other hand, female headed households have a higher chance of seeking skilled birth attendance (2%) compared to male headed households. The results of the two variables are however not significant. An urban resident significantly increases the chance of skilled birth attendance by 18 per cent compared to rural residence. This can be attributed to access issues in rural areas as well as beliefs and attitudes (Baral *et al.*, 2010).

Table 4.4: Effect of health insurance on utilization of skilled birth attendance-Logit results

Independent Variables	Coefficients (Logit)	Marginal Effects	Odds ratio
Health insurance status	1.028* (0.22)	0.249* (0.05)	2.80* (0.61)
Wealth index (reference group: Poor)			
Middle	0.470* (0.09)	0.117* (0.02)	1.60* (0.14)
Rich	0.688* (0.09)	0.169* (0.02)	1.99* (0.18)
Education level (reference group: No education)			
Primary	0.666* (0.09)	0.161* (0.02)	1.95* (0.18)
Secondary	1.430* (0.12)	0.340* (0.02)	4.18* (0.49)
Post-secondary	1.950* (0.24)	0.421* (0.04)	7.03* (1.73)
Employment status	0.202* (0.07)	0.049* (0.02)	1.22* (0.08)
Area of residence	0.714* (0.09)	0.175* (0.02)	0.49* (0.05)
Number of household members	-0.010 (0.01)	-0.003 (0.004)	0.99 (0.01)
Gender of household head	0.083 (0.07)	0.020 (0.02)	1.09 (0.08)
Birth order	-0.130* (0.03)	-0.032* (0.006)	0.88* (0.02)
Mother's age group (reference group: 15-24 years)			
25-34	0.077 (0.09)	0.0189 (0.02)	1.08 (0.10)
>35	0.216 (0.16)	0.053 (0.04)	1.24 (0.19)
Mother's age at first birth	0.028** (0.01)	0.007** (0.00)	1.03** (0.01)
Distance to Hospital -proxied by time to fetch water (Reference group=premises)			
Less than one hour	-0.850* (0.08)	-0.207* (0.02)	0.43* (0.03)
One hour or more	-0.736* (0.11)	-0.171* (0.02)	0.48* (0.05)
Constant	0.163 (0.34)	-	-
Log likelihood = -3133.6684; Number of observations = 5903; LR chi2(16)=1806.39; Prob > chi2 = 0.0000; Pseudo R2 = 0.2237			

Source: Author's computation from KDHS

*, **, significant at 1% and 5% respectively; Standard errors in parenthesis

Considering the demographic characteristics, the effect of mothers' age group on probability of skilled birth attendance is positive, but insignificant. In relation to younger mothers aged between 15 and 24 years of age, those aged between 35 and 34 years of age have about 2 per cent probability of seeking skilled birth attendance. Among women aged above 35 years of age, the probability of seeking skilled birth attendance was higher by 5 per cent. However, a look at the mother's age at first birth shows that this variable significantly increases the chance of seeking birth attendance by 0.7 per cent. A unit increase in birth order significantly decreases the probability of skilled birth attendance by 3 per cent.

5. Conclusion and Policy Recommendations

5.1 Conclusion

This study examined the effect of health insurance on child and maternal health outcomes. Child health was proxied using child mortality, while skilled birth attendance was used as a measure of maternal health. The logistic regression model was estimated using the 2008-2009 KDHS data. The results do not find a significant effect of health insurance on child health. Health insurance, however, is significant in improving maternal health.

Other important traditional determinants that significantly improve both child and maternal health include: distance to health facility, wealth index, employment status and education, especially post-secondary level of education. Area of residence also significantly affects child as well as maternal health. Individual child characteristics such as gender and single birth as well as environmental characteristics, mainly sanitation, are important in determining child health. With regard to maternal health, age at first birth matters.

5.2 Policy Recommendations

Enhance the uptake of health insurance

The improvement in maternal health as a result of increased use of skilled birth attendance calls for policy strategies that will enhance uptake of health insurance. The government should consider introducing a compulsory uptake of health insurance, while subsidizing for the poor who cannot afford to pay the premiums. Uptake of health insurance may also be achieved through improved education attainment and increased labour force participation, and enhancing poverty reduction strategies. Increase in the uptake of health insurance will not only contribute to better health outcomes, but also improve the revenue collected by the health sector. This can in turn be used to improve health infrastructure.

Ensure even distribution of health facilities

To improve health outcomes of the entire population, especially the vulnerable groups including mothers and children, there is need to ensure even distribution of health facilities. This will reduce distance to health facilities, which in turn decreases the household financial burden arising from transport and time costs. This can be done effectively through public private partnerships. In addition, revenue from health insurance may be channeled to improve health infrastructure.

Public private partnerships

Due to financial burden, health care cannot be provided entirely by the government. Public private partnerships should be encouraged to enhance efficient and effective provision of health care, even in the area of health insurance. While focusing on development of Kenya National Social Health Insurance, the government should also encourage the growth of other forms of health prepayment schemes, including private and community based health insurance. However, this should be coupled with enhancing competitive behaviour to encourage development of inventive and affordable insurance policy covers.

Education and public awareness/behaviour change

Given that majority of mothers have primary level of education, there is need to strengthen measures that ensure access to secondary as well as post-secondary education. Health awareness campaigns by the government and scheme providers through various channels, including the media, should be conducted to inform and encourage behaviour change among the less educated.

Employment and poverty reduction strategies

The socio-economic and employment status significantly affects both child and maternal health status. Poverty reduction strategies should be enhanced by creating opportunities that enhance income generation. While creation of employment is important for enhancing maternal health, there is need to ensure flexibility in maternal labour force participation so as to grant maximum care to the children.

5.3 Areas for Further Research

The study did not find any significant effect of health insurance on child health. There is need to investigate the effect using other measures of child health including nutritional status.

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Appendix

Appendix Table 1: Correlation Matrix

	Skilled birth attendance	Residence	Education	Number of household members	Gender of head	Health insurance	Mother's age	Distance to hospital	Wealth Index	Employed	Birth order	Age at first birth	Place of Delivery	Child alive
Skilled birth attendance	1													
Residence	0.3638	1												
Education	0.4087	-0.2997	1											
Number of household members	-0.1855	0.2152	-0.1835	1										
Gender of household head	-0.0189	0.0616	-0.0577	-0.1395	1									
Health insurance	0.2170	-0.1763	0.3558	-0.0610	-0.0331	1								
Mother's age group	-0.0384	0.0884	-0.0027	0.2441	0.0339	0.0976	1							
Distance to hospital	-0.3547	0.3898	-0.3914	0.1642	0.0748	-0.1937	0.0047	1						
Wealth Index	0.4431	-0.5994	0.4542	-0.2543	-0.0495	0.2336	-0.0875	-0.4912	1					
Employed	0.0990	0.0133	0.2160	0.0058	0.0120	0.1032	0.1349	-0.0729	0.0671	1				
Birth order	-0.2420	0.2388	-0.2657	0.4740	0.0075	-0.0715	0.6716	0.1843	-0.2919	0.0824	1			
Age at first birth	0.2380	-0.1862	0.3570	-0.1556	-0.0227	0.2601	0.3049	-0.2174	0.2229	0.0578	-0.2155	1		
Place of delivery	0.8703	0.3890	0.4592	-0.1841	-0.0437	0.3104	-0.0196	-0.3756	0.4584	0.0999	-0.2450	0.2793	1	
Child alive	-0.0026	-0.0158	0.0080	-0.0863	-0.0034	-0.0113	0.0206	-0.0285	0.0162	-0.0346	-0.0273	0.0229	0.0036	1

Source: Computed from KDHS

